Notice of Allowability	**Application No.** 10/680,823	**Applicant(s)** GERLACH, TOBIAS
	Examiner John H Le	**Art Unit** 2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.

2. ☒ The allowed claim(s) is/are *1-10*.

3. ☒ The drawings filed on *07 October 2003* are accepted by the Examiner.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
   1. ☒ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
   1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 10/07/03,10/23/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Reasons for Allowance

1. Claims 1-10 are allowed.

2. The following is an examiner's statement of reasons for allowance:

In combination with other limitations of the claims, the cited prior arts fails to teach steps of performing a frequency spectral analysis of the armature current signal in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of the current ripples contained in the armature current signal; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the number of counted current ripples upon a change in the current ripple frequency in a given time interval if the change in the current ripple frequency deviates from the current ripple frequency more than a threshold deviation for the given time interval; and determining the rotational position of the drive shaft based on the modified number of counted current ripples, as recited in claim(s) 1.

In combination with other limitations of the claims, the cited prior arts fails to teach steps of performing a frequency spectral analysis of an armature current signal of the motor as the motor rotatably drives the drive shaft in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of current ripples contained in the armature current signal; determining rotational speed of the drive shaft as a function of the current ripple frequency; determining rotational position of the drive shaft as a function of the rotational speed of the drive shaft; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the determined rotational position of the drive shaft as a function of a change in the current ripple frequency, as recited in claim(s) 6.

U.S. Patent No. 6,657,407 discloses a method for determining the position of a movable element driven by a motor shaft includes using a counter to count current ripples contained in an armature current signal of the motor as the motor shaft rotates to drive the element. The position of the element is determined based on the counted current ripples. Upon power to the motor being interrupted such that the motor shaft slows down during the power interruption and upon the counter being prevented from counting the current ripples contained in the armature current signal of the motor during the slowdown of the motor shaft, an amount of current ripples expected to be contained in the armature current signal of the motor during the slowdown of the motor shaft is estimated. The position of the element during the slowdown of the motor shaft is determined based on the estimated amount of current ripples. ‘407 fails to specify the steps of performing a frequency spectral analysis of the armature current signal in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of the current ripples contained in the armature current signal; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the number of counted current ripples upon a change in the current ripple frequency in a given time interval if the change in the current ripple frequency deviates from the current ripple frequency more than a threshold deviation for the given time interval, as now recited in claim 1 of the present invention. '407 also fails to specify the steps of performing a frequency spectral analysis of an armature current signal of the motor as the motor rotatably drives the drive shaft in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of current ripples contained in the armature current signal; determining rotational speed of the drive shaft as a function of the current ripple frequency; determining rotational position of the drive shaft as a function of the rotational speed of the drive shaft; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the determined rotational position of the drive shaft as a function of a change in the current ripple frequency, as now recited in claim 6 of the present invention.

U.S. Patent No. 6,144,179 discloses a method for determining the rotational speed and/or the angle of rotation of mechanically commutated D.C. motors from the variation with respect to time of the ripple of the motor current occurring during commutation is supplemented and checked by a motor state model that functions in parallel to it and is based on the electromechanical motor equations. ‘179 fails to specify the steps of performing a frequency spectral analysis of the armature current signal in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of the current ripples contained in the armature current signal; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the number of counted current ripples upon a change in the current ripple frequency in a given time interval if the change in the current ripple frequency deviates from the current ripple frequency more than a threshold deviation for the given time interval, as now recited in claim 1 of the present invention. ‘179 also fails to specify the steps of performing a frequency spectral analysis of an armature current signal of the motor as the motor rotatably drives the drive shaft in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of current ripples contained in the armature current signal; determining rotational speed of the drive shaft as a function of the current ripple frequency; determining rotational position of the drive shaft as a function of the rotational speed of the drive shaft; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the determined rotational position of the drive shaft as a function of a change in the current ripple frequency, as now recited in claim 6 of the present invention.

U.S. Patent No. 5,977,732 discloses a method for determining the rotational speed of a drive shaft of a motor based on the current ripple frequency, monitoring the current ripple frequency during the operation of the motor by counting the current ripples. '732 fails to specify the steps of performing a frequency spectral analysis of the armature current signal in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of the current ripples contained in the armature current signal; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the number of counted current ripples upon a change in the current ripple frequency in a given time interval if the change in the current ripple frequency deviates from the current ripple frequency more than a threshold deviation for the given time interval, as now recited in claim 1 of the present invention. '732 also fails to specify the steps of performing a frequency spectral analysis of an armature current signal of the motor as the motor rotatably drives the drive shaft in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of current ripples contained in the armature current signal; determining rotational position of the drive shaft as a function of the rotational speed of the drive shaft; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the determined rotational position of the drive shaft as a function of a change in the current ripple frequency, as now recited in claim 6 of the present invention.

U.S. Patent No. 4,924,166 discloses a circuit for shaping ripple in the armature current of a D.C. motor. The circuit includes a phase-locked loop. The cut-off frequency of a switched capacitor filter is controlled by a voltage controlled oscillator to be proportional to the basic ripple in the armature current and serves to attenuate the harmonics in the signal applied to the input of the phase-locked loop. '166 fails to specify the steps of performing a frequency spectral analysis of the armature current signal in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of the current ripples contained in the armature current signal; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the number of counted current ripples upon a change in the current ripple frequency in a given time interval if the change in the current ripple frequency deviates from the current ripple frequency more than a threshold deviation for the given time interval, as now recited in claim 1 of the present invention. '166 also fails to specify the steps of performing a frequency spectral analysis of an armature current signal of the motor as the motor rotatably drives the drive shaft in order to determine frequency components of the armature current signal;

analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of current ripples contained in the armature current signal; determining rotational speed of the drive shaft as a function of the current ripple frequency; determining rotational position of the drive shaft as a function of the rotational speed of the drive shaft; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the determined rotational position of the drive shaft as a function of a change in the current ripple frequency, as now recited in claim 6 of the present invention.

U.S. Patent No. 4,744,041 discloses a DC parameter motor tester based on current time response, which tester does not require coupling of the motor (14) to some mechanical device or measuring other noise sensitive parameters taken from only a few discrete data points. The steady state speed of the motor is determined from the frequency composition of the commutation noise and ripple in the steady state current by performing a fast fourier transform on the steady state current to determine its power-spectral-density which shows the frequency composition of the steady state current waveform by giving the power in the waveform at each frequency. The frequency, which the most power exists, is divided by the number or twice the number, depending upon the construction of the motor, of commutation segments in the motor to determine the motor's frequency of rotation or velocity at measured power input. '041 fails to specify the steps of performing a frequency spectral analysis of the armature current signal in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of the current ripples contained in the armature current signal; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the number of counted current ripples upon a change in the current ripple frequency in a given time interval if the change in the current ripple frequency deviates from the current ripple frequency more than a threshold deviation for the given time interval, as now recited in claim 1 of the present invention. '041 also fails to specify the steps of performing a frequency spectral analysis of an armature current signal of the motor as the motor rotatably drives the drive shaft in order to determine frequency components of the armature current signal; analyzing the frequency components identified in the frequency spectral analysis of the armature current signal in order to determine which of the frequency components of the armature current signal is indicative of the frequency of current ripples contained in the armature current signal; determining rotational speed of the drive shaft as a function of the current ripple frequency; determining rotational position of the drive shaft as a function of the rotational speed of the drive shaft; monitoring the current ripple frequency for changes over time while the motor drives the drive shaft; modifying the determined rotational position of the drive shaft as a function of a change in the current ripple frequency, as now recited in claim 6 of the present invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H. Le whose telephone number is 571-272-2275. The examiner can normally be reached on 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le
Patent Examiner-Group 2863
September 24, 2004

John Barlow
Supervisory Patent Examiner
Technology Center 2800